

extracting virtual sensor data by performing a ray casting method on all directions while the cleaning robot rotates at an angle of 360 degrees in a virtual sensor data extraction position selected with respect to the current position of the cleaning robot to thereby acquire the local map, or

extracting the local map having a predetermined size with respect to each of a plurality of local map extraction positions selected with respect to the current position of the cleaning robot from the environmental map.

15. The control method of the cleaning robot according to claim **12**, wherein the determining of the current position coordinates includes:

acquiring a plurality of corresponding points through data matching between the actual sensor data and the local map,

calculating a relative position of the actual sensor data to the local map using the acquired plurality of corresponding points,

calculating similarity between a plurality of local maps and the actual sensor data, and

determining the relative position of the cleaning robot to the local map having the highest similarity as the current position of the cleaning robot for the environmental map.

16. The control method of the cleaning robot according to claim **15**, wherein the calculating of the similarity includes determining that higher similarity is obtained along with an increase in the number of data points which are commonly included in the local map and the actual sensor data.

17. The control method of the cleaning robot according to claim **12**, wherein the determining of the traveling direction includes:

acquiring a plurality of straight lines from the local map, and

calculating the main segment angle by classifying the plurality of straight lines according to angles.

18. The control method of the cleaning robot according to claim **17**, wherein the calculating of the main segment angle includes:

generating an angle histogram by classifying the plurality of straight lines according to the angles, and

determining the main segment angle in consideration of distribution of the angle histogram.

19. A localization apparatus for a cleaning robot which recognizes a position of the cleaning robot moved to an arbitrary position by a user, comprising:

a data acquisition unit to acquire actual sensor data by measuring a distance from a sensor installed in the cleaning robot to an object to be measured in the arbitrary position; and

a local map acquisition unit to acquire a local map by scanning the vicinity of the arbitrary position based on map information of an environment in which the cleaning robot is operated,

a processor that recognizes a relative position of the cleaning robot for the local map by performing matching between the local map and the actual sensor data.

20. The localization apparatus for the cleaning robot according to claim **19**, further comprising:

a display unit to display information that localization of the cleaning robot is completed; and

a sound output unit to output a sound indicating that the localization of the cleaning robot is completed.

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